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Electromagnetic hypersensitivity (EHS) in the media – a qualitative content analysis of Norwegian newspapers

Åshild Huiberts[1], Mari Hjørnevik[1], Arnstein Mykletun[1] and Jens C Skogen[1,2]
[1]Research Centre for Health Promotion and Development, Faculty of Psychology, University of Bergen, 5015 Bergen, Norway
[2]Department of Public Mental Health, Norwegian Institute of Public Health, Division of Mental Health, 5018 Bergen, Norway
Corresponding author: Jens C Skogen. Email: jens.skogen@uni.no

Summary

Objectives: Electromagnetic hypersensitivity (EHS) is a condition characterized by experiencing symptoms after perceived exposure to weak electromagnetic fields (EMFs). There is substantial debate concerning the aetiology of EHS, but experimental data indicate no association between EHS and actual presence of EMFs. Newspapers play a key role in shaping peoples' understanding of health-related issues. The aim of this study was to describe the content of newspaper articles concerning aetiology and treatment of EHS.

Design: Qualitative content analysis of newspaper articles.

Setting: Norwegian newspaper articles were identified using a comprehensive electronic media archive.

Participants: Norwegian newspaper articles published between 1 February 2006 and 11 August 2010.

Main outcome measures: Statements coded according to source of information, whether it was pro or con scientific evidence on EHS aetiology, and type of intervention presented as treatment option for EHS.

Results: Of the statements concerning EHS aetiology ($n = 196$), 35% ($n = 69$) were categorized as pro evidence, 65% ($n = 127$) as con evidence. Of the statements about EHS interventions assessed, 78% ($n = 99$) were categorized as 'radiance reduction', 4% ($n = 5$) as 'complementary medicine', and 18% ($n = 23$) as 'other'. Cognitive behavioural therapy (CBT) and psychotropic drugs were never presented as possible treatment options for EHS.

Conclusions: The newspaper media discourse of EHS aetiology and recommended treatment interventions is much in conflict with the current evidence in the field. The majority of statements concerning aetiology convey that EHS is related to the presence of weak EMFs, and radiance reduction as the most frequently conveyed measure to reduce EHS-related symptoms.

Keywords

electromagnetic hypersensitivity, EHS, media, newspapers, qualitative content analysis

Background

Exposure to man-made electromagnetic fields (EMFs) has increased over the past decades.[1] In parallel with this development, there is growing public concern that high-frequency EMFs could cause adverse health effects even at exposure levels far below international guidelines.[2]

Electromagnetic hypersensitivity (EHS) is a condition characterized by experiencing symptoms after perceived exposure to weak EMFs such as those produced by visual display units and mobile phones.[3] Individuals with this condition suffer from a wide range of non-specific health symptoms, which they attribute to either one or several specific sources of EMF.[4] A large degree of heterogeneity exists within this condition, both with regard to symptom pattern as well as prevalence rates.[5] While some areas such as UK and Sweden have prevalence rates of 4% and 1.5%, respectively,[6,7] there are apparently very few, if any, EHS sufferers in Iran.[8]

Little is known about the aetiology of EHS, although experimental data from several review reports suggests that the condition is unrelated to the presence of EMFs.[3–5] Although some studies did observe an association between EMF exposure and symptom pressure, these tended to be either un-replicated or statistically unreliable.[5] While the causal agent in EHS is unknown, the condition often has profound implications for sufferers' quality of life.[3] It is associated with poorer general health, reduced social functioning, increased use of health services and decrements in psychological well-being.[9–11] Furthermore, EHS is also associated with reduced occupational functioning, with higher levels of unemployment, early retirement and disability pensions than the normal population.[7] Thus, the condition involves great suffering, distress and disability, which amounts to substantial personal and societal costs.[12] EHS can consequently be regarded as a functional somatic syndrome, which is a generic term

describing several conditions in which symptoms, suffering and disability is present, while consistent demonstrable tissue abnormality is lacking.[13]

The evidence base concerning treatment for EHS is still limited.[14] However, the best currently available evidence suggests that cognitive behavioural therapy (CBT) is the most appropriate treatment option for these patients. Alternative treatments, such as supplementary antioxidant therapy, acupuncture and EMF shielding interventions, constitute popular treatment choices for this group, despite not having their efficacy adequately demonstrated.[14,15]

Public interest in health information has grown in recent years, and there is a parallel rise in health-related content in media.[16] Correspondingly, there is a growing concern whether the mass media coverage of health information is accurate and adequately presented.[17] The media coverage of functional somatic syndromes in general are often characterized by sensationalistic and uncritical reporting.[13] This raises the question of whether the same is true for the reporting of EHS as well. To the best of our knowledge, a study involving an assessment of what is stated in newspapers concerning EHS has not been conducted.

The aim of this study was to describe the content of newspaper articles concerning aetiology and treatment interventions for EHS. Content analysis was applied, and the content was coded according to source of information, whether it was pro or con scientific evidence on EHS aetiology, and type of intervention presented as treatment option for EHS.

Methods

Qualitative content analysis methodology was employed as a systematic approach to analyse data through coding and quantification of relevant statements about EHS in the media.[18] More specifically, a directed approach to content analysis was applied,[19] by using existing theory and research on the field of EHS to identify key concepts or variables as initial coding categories. Operational definitions for each category were thereafter determined based on this theoretic foundation.

Search

The data collection process was achieved by employing the digitalized Norwegian media archive Atekst. Atekst enables searching through 82 newspapers; among these the 10 most widely circulated Norwegian newspapers during 2008.[20] The search was limited to newspaper issues published between 1 February 2006 and 11 August 2010, and conducted on 27 August 2010. Relevant hits published before 1 February 2006 were excluded ($n = 39$) due to no systematic reviews[14] on EHS treatments available before this. National, regional and local newspapers were included, while journals, periodicals, news agencies and press releases were excluded. This resulted in the search being confined to 59 of 82 available newspaper sources. When searching for relevant articles, several predefined Norwegian EHS-related keywords such as 'el-overfølsomhet' (electrical hyper-sensitivity) or 'el-allergi' (el-allergy) or 'stråling allergi' (radiation allergy) or 'elektromagnetisk' (electromagnetic) and 'allergi' (allergy) or 'allergisk' (allergic) were used, which gave altogether 79 results. Boxes of facts linked to the articles were counted as separate hits; this was also the case for related text with a separate headline. This added 18 results, which gave a total of 92 hits when duplicate articles were removed ($n = 5$). Only the pages including the keyword were found by the search engine; therefore, some articles were presented incompletely. These articles ($n = 5$) were completed by browsing the relevant newspaper manually to find the missing page(s).

Data collection

The data collection process consisted of extracting and coding statements about EHS in relation to predefined categories. Thus, deductive category construction was applied, devising a priori formulated, theoretical categorization system of analysis and connecting it to the written material.[21] In order to assess the validity of the categorization system, a random number generator was used to extract approximately 10% ($n = 10$) of total hits from the data material which compromised a pilot. Two raters coded the material in the pilot separately, which led to a revision of the categorization system based on experiences drawn from this process. The final categorization system consisted of eight different content categories related to six different sources, which made a total of 48 possible combinations of statement and source applied to text.

More specifically, statements about EHS aetiology and recommended interventions presented as reducing or preventing EHS symptoms were coded based on source and content of the statement. Sources consisted of six separate categories: public authorities, advocacy groups, personal sufferers or next of kin, researchers, health professionals and others. Statements about EHS aetiology were classified in terms of being pro evidence, con evidence or unclassifiable evidence. Statements were coded pro evidence if they stated that exposure of EMF sources below international guidelines is unrelated to EHS

symptoms, or that aetiology of EHS symptoms is still unknown, or if they pointed to psychological mechanisms as contributing to EHS symptoms. Statements were categorized as con evidence if EHS symptoms were associated with exposure of EMF sources below international guidelines. An unclassifiable evidence statement contained relevant information about EHS aetiology, but did not fit the inclusion criteria in either of the other two aetiology categories.

Interventions were divided into five categories: radiance reduction, CBT, complementary medicine, psychotropic drugs and others. Statements were coded reduction of radiance if they pointed to shielding from EMF sources as an EHS symptom reduction measure, CBT if they endorsed this treatment option, complementary medicine if alternative treatment options were recommended, psychotropic drugs if they presented psychoactive medication as effective, and others if they contained information about EHS reduction or prevention that did not fit the inclusion criteria for any of the previous mentioned intervention categories. In sum, this resulted in 12 categories, in which the first six divided content of EHS aetiology statements in three different subcategories, and the latter six divided content of EHS interventions into five different subcategories.

Inter-rater agreement

Inter-annotator agreement for the categorical items was measured through training a collaborator in the categorization system devised, followed by coding the data separately, and computing a Cohen's kappa coefficient (κ) between the two sets of scores for each of the subcategories. More specifically, the two sets of codes were juxtaposed in Microsoft Excel®, and matched within each hit after identifying the coded statements. Differences in both source and content categories were paired and registered. Data material used in the pilot was excluded from kappa calculations to avoid an artificially high kappa score. This gave 320 codes in total. Cohen's kappa computed for the content categories pooled together resulted in $\kappa = 0.90$. Overall, the inter-rater agreement in this study was good.

Analysis

All analyses were performed on the original data-set that included codes from hits used in the pilot. In addition, adjudication was applied whereby the two raters agreed upon and merged the codes that initially differed.[22] The final data-set consisted of 323 codes in total. Distributions of statements through per cent calculations for the various content categories were subsequently derived from this data-set. The statements were then adjusted for newspaper circulation and article size. Due to the inclusion of a span of national, regional and local newspapers in this study, the adjustment of statements in relation to the newspapers' circulation from 2008[20] was made. A statement printed in a local newspaper will not be distributed to as many people as a national newspaper, and each statement was therefore multiplied with the circulation of the relevant newspaper. The statements were found in newspaper articles of all sizes, thus a statement found in a small note would be registered in an equivalent way to a statement found in a large article, while the larger article may be considered to draw more attention than the smaller. To control for this potential different impact factor of the statements, the articles were ranged into four sizes, and multiplied with a predefined number according to size. The different sizes were the following (listed with the multiplicands in brackets): notes were categorized as small (0.1); from note size up to one page as medium (0.5); more than one page and up to two pages as large (1.5) and more than two pages as extra large (3.0). When Atekst provided the articles only as text files, an estimate was made to measure the size compared to the tabloid format, and then adjustment for size was completed as described above. This was done by taking into account how many words the article compromised, with articles up to 200 words registered as small, from 200 to 1200 words registered as medium, 1200 to 2400 words registered as large, and articles containing over 2400 words were registered as extra large size.

Each statement was thus multiplied with the relevant size and circulation number, and the statements within each category were summarized (Table 3). Per cent calculations were performed on these summarized numbers when controlling for size and circulation. Microsoft® Excel software was used for the calculations.

Ethics

This study has been evaluated by the Regional Ethics Committee (REK), who had no objections to the study. The study was also regarded as not obligated for submission to REK because examination of written material in the media is beyond the Norwegian law on health research.

Results

A total of 196 statements were regarded as containing relevant information about EHS aetiology (Table 1). Of these, 35% ($n = 69$) were categorized as pro

Table 1. Distribution of newspaper statements regarding electromagnetic hypersensitivity aetiology ($n = 196$).

Aetiology source	Pro evidence*	Con evidence**	Unclassifiable evidence (%)
Public authorities	12.2%	3.1%	0
	95%: CI 7.7–16.8	95%: CI 0.6–5.5	
	$n = 24$	$n = 6$	
Advocacy groups	1.0%	7.1%	0
	95% CI 0.0–2.4	95% CI 3.5–10.7	
	$n = 2$	$n = 14$	
Personal sufferers/ Next of kin	0%	26.5%	0
	95% CI 0.0–0.0	95% CI 20.3–32.7	
	$n = 0$	$n = 52$	
Researchers	5.6%	6.1%	0
	95% CI 2.4–8.8	95% CI 2.8–9.5	
	$n = 11$	$n = 12$	
Health professionals	3.1%	3.1%	0
	95% CI 0.6–5.5	95%: CI 0.6–5.5	
	$n = 6$	$n = 6$	
Other sources	13.3%	18.9%	0
	95% CI 8.5–18.0	95% CI 13.4–24.4	
	$n = 26$	$n = 37$	
Sum	35.2%	64.8%	0
	95% CI 28.5–41.9	95% CI 58.1–71.5	
	$n = 69$	$n = 127$	

Percentage of total (CI; frequency).
*Statements conveying that exposure of EMF sources below international guidelines are unrelated to EHS symptoms, or that aetiology of EHS symptoms is still unknown, or pointing to psychological mechanisms as contributing to EHS symptoms.
**Statements conveying that EHS symptoms are associated with exposure of EMF sources below international guidelines.

evidence, while 65% ($n = 127$) were regarded as con evidence. None of the aetiology statements were categorized as unclassifiable evidence ($n = 0$). Of the statements about EHS interventions assessed, 78% ($n = 99$) were categorized as radiance reduction, 4% ($n = 5$) were categorized as complementary medicine, and 18% ($n = 23$) as other (Table 2). CBT and psychotropic drugs were never presented as possible treatment options of EHS.

After adjustment for newspaper circulation and for the size of the article the percentages in the categories were altered to a small degree, but still showed the same pattern (Table 3). Within aetiology statements, 31% were categorized as pro evidence, while 69% were con evidence. Of the statements about EHS interventions, 81% were radiance reduction, 0.7% were complementary medicine, and 18% were other.

Discussion

The main findings of this study were that the newspaper media discourse of EHS aetiology and

Table 2. Distribution of newspaper statements concerning electromagnetic hypersensitivity interventions ($n = 127$).

Interventions source	Radiance reduction	Cognitive behavioural therapy	Complementary medicine*	Psychotropic drugs	Other interventions**
Public authorities	7.1%	0%	0%	0%	6.3%
	95% CI 2.6–11.5				95% CI 2.1–10.5
	$n = 9$				$n = 8$
Advocacy groups	4.7%	0%	0.8%	0%	1.6%
	95% CI 1.0–8.4		95% CI 0.0–2.3		95% CI 0.0–3.7
	$n = 6$		$n = 1$		$n = 2$
Personal sufferers/ Next of kin	29.9%	0%	3.1%	0%	0.8%
	95% CI 22.0–37.9		95% CI 0.1–6.2		95% CI 0.0–2.3
	$n = 38$		$n = 4$		$n = 1$
Researchers	6.3%	0%	0%	0%	1.6%
	95% CI 2.1–10.5				95% CI 0.0–3.7
	$n = 8$				$n = 2$
Health professionals	3.9%	0%	0%	0%	0.8%
	95% CI 0.6–7.3				95% CI 0.0–2.3
	$n = 5$				$n = 1$
Other sources	25.2%	0%	0%	0%	7.1%
	95% CI 17.6–32.7				95% CI 2.6–11.5
	$n = 32$				$n = 9$
Sum	78.0%	0%	3.9%	0%	18.1%
	95% CI 70.7–85.2		95% CI 0.6–7.3		95% CI 11.4–24.8
	$n = 99$		$n = 5$		$n = 23$

Percentage of total (CI; frequency).
*Statements recommending alternative treatment options.
**Statements containing information about EHS reduction or prevention that does not fit the inclusion criteria for any of the other intervention categories.

recommended interventions appear to contrast markedly with the current evidence in the field. The majority of statements concerning aetiology of EHS were conveying that EHS is related to the presence of weak EMFs (Table 1), which is in opposition to the current evidence stating that EHS is unrelated to the presence of EMFs.[3–5] The newspaper articles most frequently conveyed radiance reduction as a measure to reduce EHS-related symptoms (Table 2), while CBT was never recommended.

A central strength of this study lies in the data collection process, which involves a comprehensive search covering articles from 56 Norwegian newspapers, including the 10 most widely circulated. Furthermore, a pilot coding phase was carried out to assess the comprehensiveness of the category

Table 3. Newspaper statements regarding electromagnetic hypersensitivity adjusted for circulation and size.

Distribution of aetiology statements	
Pro evidence	31.5%
Con evidence	68.5%
Distribution of intervention statements	
Radiance reduction	81.2%
Cognitive behavioural therapy	0.0%
Complementary medicine	0.7%
Psychotropic drugs	0.0%
Other interventions	18.1%

system, leading to a revised manual drawn from pilot experiences. Another strength of this study is the high inter-rater agreement between the two independent raters ($\kappa = 0.90$ for all content categories pooled), which lends support to the classification procedure being reliable with regard to consistency. Finally, the same pattern of statement distribution remained after adjusting for newspaper circulation and article size (Table 3), suggesting that circulation and article size can be discarded as potential biasing factors.

However, this study also has several limitations. Firstly, rich statements have been condensed into dichotomous categories, thus risking the possibility of failing to discover important nuances. Further, the categorization process employed subjective judgements based on coders' own mental schemas, which may entail an understanding not shared by other readers. However, the high level of inter-rater agreement indicates that the interpretations, while subjectively derived, were shared across coders. Misclassification of sources may also have occurred, due to coding all statements in a fact box as coming from the cited sources, even though various statements may come from various sources. On the other side, even though the statements may not actually come from the cited source, this is how it appears to the reader.

Another potential drawback is the limitation of data collection to newspaper media, which entails a possibility of reaching a special sub-population of the public. However, Norwegians are the top most newspaper-buying people worldwide:[23] On any given day an average of 96% of Norwegians read newspapers.[24] Finally, there is always the issue of generalizability of findings beyond the context of the study. To our knowledge, this is the first study examining how EHS is portrayed in the media, so no immediate comparison can be found in the literature.

Somatic symptoms and medically unexplained distress have a long history, but social and cultural factors of each era shape the expression, understanding and attribution of these symptoms.[13,25,26] Thus, similar symptom patterns receive different diagnostic labels and are attributed to different causes in different time periods. An important question is how media portrayal of EHS potentially affects interpretation and attribution of these symptom clusters, which in turn may affect the prevalence of EHS. Indeed, health information in the media was reported as triggering the hypothesis of EHS in 24% of EHS sufferers.[27] This study shows that discourses about aetiology and recommended interventions promoted in newspaper media deviate from current evidence on the field, and this may play a key role in shaping readers' understanding of diffuse somatic symptoms, and choice of treatment. It can be argued that media presentation of EHS found in this study causes unfavourable consequences, by linking symptoms that have a high incidence in the population[28] to exposure of weak EMFs, thereby promoting a disease attribution that have substantial personal and societal costs. Conveying an association between symptoms and EMFs might induce the EHS hypothesis, and suspicion of illness heightens symptom perception and distress, which in turn may reinforce the judgment that one is ill.[13]

Further, the endorsement of EMF shielding interventions and omission of CBT interventions embedded in the newspaper articles may also amount to substantial costs both on individual and societal level by promoting undocumented treatment options.[14]

How can media avoid promoting EHS symptoms and distress in the public? Firstly, the relationship between science and media is important. Media does not simply mirror 'reality' provided by scientific knowledge, but actively selects which reality to convey. The framework within which journalists work entails implicit criteria for information selection that deviates substantially from communication structures in science – namely actuality, sensation, personalization and locality.[29] Consequently, the news media are often criticized for ignoring the broad societal issues that are often more significant for public health in favour of more interesting personalized stories about individuals.[30] To avoid this, one could cooperate with schools of journalism to provide training in, and guidelines for, scientific reporting of health science.[16] But the responsibility cannot

be placed on media alone. The public health community and relevant public authorities should take into account media's role as gatekeepers who stand between them and the public. Prevention may also be excised by educating the public to be informed consumers of health information in the mass media.

Conclusion

In conclusion, the newspaper media discourse of EHS aetiology and recommended treatment interventions appears to contrast markedly with the current evidence in the field. This portrayal of EHS may entail unfavourable implications, by linking aetiology and treatment of symptoms with high incidence in the population to exposure of weak EMFs, thereby promoting a disease attribution that is associated with substantial personal and societal costs.

Declarations

Competing interests: None declared

Funding: None declared

Ethical approval: This study has been evaluated by the Regional Ethics Committee (REK), which had no objections to the study. The study was also regarded as not obligated for submission to REK because examination of written material in the media is beyond the Norwegian law on health research.

Guarantor: JCS

Contributorship: AM conceived of the initial idea. ÅH and MH carried out the literature search, the data collection and the analyses under supervision of AM and JCS. ÅH wrote the first draft under supervision of AM and JCS. All authors contributed towards the final manuscript, and approved the final version.

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